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**High-performance Mg-ion conducting poly(vinyl alcohol) membranes:
Preparation, characterization and application in supercapacitors**

Jingwei Wang^{a1}, Zejia Zhao^{b1}, Ravi Muchakayala^a, Shenhua Song^{a*}

^aShenzhen Key Laboratory of Advanced Materials, Department of Materials Science and Engineering, Shenzhen Graduate School, Harbin Institute of Technology, Shenzhen – 518055, China

^bState Key Laboratory in Ultra-precision Machining Technology, Department of Industrial and Systems Engineering, the Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong SAR, China

shsong@hit.edu.cn

shsonguk@aliyun.com

*Corresponding author. Tel.: +86-755-26033465.

ABSTRACT

The highly stretchable pure poly(vinyl alcohol) (PVA) membranes with high amorphicity and large ductility are prepared based on an N-methylpyrrolidone (NMP) solution. Meanwhile, the PVA based gel electrolyte membranes doped with magnesium trifluoromethanesulfonate ($\text{Mg}(\text{Tf})_2$) and plasticized with 1-ethyl-3-methylimidazoliumtrifluoromethanesulfonate (EMITf) are fabricated with the NMP as the solvent. For the plasticized membranes, the 60PVA-40 $\text{Mg}(\text{Tf})_2$ + 10EMITf electrolyte system exhibits the highest room-temperature ionic conductivity ($1.2 \times 10^{-3} \text{ S cm}^{-1}$), excellent thermal performance and satisfying strength and flexibility. This

¹ Co-first author

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